

# RETURN-FLOW WATER FROM IRRIGATION DEVELOPMENTS.<sup>1</sup>

By R. I. MEEKER, Irrigation Engineer, Denver, Colo.

The importance of Mr. Meeker's study of the disposal of irrigation water will be quickly recognized by all interests concerned in the development of irrigated areas. We reproduce Mr. Meeker's summary only as given in his own words:

*Summary.*—The following paragraphs summarize the conclusions of this study:

(1) Ordinarily 50 per cent of the water diverted for irrigation purposes becomes a source of return flow.

(2) Annual return flows of from 35 to 65 per cent of the river flow diverted have been measured for large compact irrigated areas.

(3) In the South Platte and tributary valleys in Colorado, where 1,100,000 acres are irrigated, return flow amounts to 1,000,000 acre-feet annually.

(4) In the Cache la Poudre Valley where irrigation is intensive and 250,000 acres are irrigated, the annual return flow is 130,000 acre-feet or about 0.50 acre-feet per acre.

(5) In the North Platte Valley, Nebr., where water is plentiful, the annual returns from 250,000 acres are 1.6 acre-feet per acre.

(6) Annual drainage returns on the two Colorado projects of 5,000 and 30,000 acres, respectively, fall close to 1 acre-foot per acre.

<sup>1</sup> *Engineering News Record*, July 20, 1922.

(7) Monthly returns throughout the year are not constant. The summer and fall months are the months of maximum return and the minimum returns occur in the winter and spring months.

(8) From 50 to 60 per cent of return flow under natural or artificial drainage occurs during the irrigation season and is available for re-use.

(9) Return-flow waters from irrigation in the older irrigated valleys are a large factor in water supply and have a large economic value.

## THE RELATION BETWEEN HAZE AND RELATIVE HUMIDITY OF THE SURFACE AIR.

By J. WADSWORTH, M. A.

[Abstract from *Professional Notes No. 26*, British Meteorological Office, 1921.]

Mr. Wadsworth has made investigations of the records at various stations in England to discover if there is any relation between the occurrence of haze and the humidity of the air. At Eskdalemuir, Valencia, and Kew he found that there was a rapid decrease in the frequency of mist and an increase in the frequency of haze as the humidity decreased. The records at Aberdeen showed that both haze and mist tended to disappear in dry air. He accounts for the contradiction by probable confusion of the terms haze and mist or the presence of other causes.—R. T. E.

## BIBLIOGRAPHY.

### RECENT ADDITIONS TO THE WEATHER BUREAU LIBRARY.

C. FITZHUGH TALMAN, Professor in Charge of Library.

The following have been selected from among the titles of books recently received as representing those most likely to be useful to Weather Bureau officials in their meteorological work and studies:

#### Australia. Commonwealth bureau of census and statistics. Melbourne.

Official year book of the Commonwealth of Australia, containing authoritative statistics for the period 1901-1920, and corrected statistics for the period 1788 to 1900. No. 14. 1921. Prepared by G. H. Knibbs and completed by John Stonham. Melbourne. [1921.] xxxviii, 1228 p. diagr. maps. 24 cm. [Climate and meteorology of Australia, p. 54-81, with charts, tables, and graphs.]

#### Brazil. Directoria de meteorologia.

Boletim de normas. Campos. 1922. viii, 68 p. 32½ cm. [Cf. this REVIEW, pp. 309-310.]

#### Čzechoslovakia. Státní ústav hydrologický.

Návod pro pozorování ovzdušných srážek. Praha. 1921. 17 p. plates. 25½ cm. (Sbírka příruček. Č. 2.)  
Návod pro pozorování teploty vzduchu. Praha. 1921. 5 p. illus. 25 cm. (Sbírka příruček. Č. 3.)  
Návod pro sněhoměrná pozorování. Praha. 1921. 8 p. illus. 25 cm. (Sbírka příruček. Č. 4.)

#### Denmark. Meteorologiske institut.

Ugeberetning om nedbør. April-September, 1919-1921. Kjøbenhavn. 1919-1921. unpag. 35 cm.

#### Hamburg. Deutsche Seewarte.

Resultate meteorologischer Beobachtungen von deutschen und holländischen Schiffen für Eingradfelder des Nordatlantischen Ozeans. Hamburg. 1921. v. 20. xxvi, 193 p. 31½ cm.

#### Letzmann, Johannes.

Die Höhe der Schneedecke im Ostbaltischen Gebiet. Dorpat. 1921. 65 p. illus. 24 cm.  
Tromben in Ostbaltischen Gebiet. Dorpat. 1920. p. 7-46. plates. 23½ cm. (Extr.: Sitzungsberichten der Naturforschergesellschaft, Universität Dorpat. Bd. 24. 1918/1919.)

#### Mexico. Secretaria de agricultura y fomento.

Carta de precipitación anual (promedios de varios años.) Año de 1922. 48 x 61 cm.

#### Mohn, H.

Atlas de climat de Norvège. Nouvelle édition par Aage Graarud et Kristen Irgens. Kristiania. 1921. 5 p. 60 plates. 31 cm. (Geofysiske publikationer. v. 2. no. 7.)

#### Vanderlinden, E.

Observations phénologiques sur des végétaux. Bruxelles. 1922. 14 p. tables. plates. 27 cm. (Extr.: Recueil de l'Institut botanique Léo Errera. T. 10.)

#### Vegard, L.

Determination of the wave length of the green line of the auroral spectrum. Kristiania. 1922. 11 p. 31 cm. (Geofysiske publikationer. v. 2. no. 5.)

#### Zierl, Hermann.

Mond und Luftdruck. [Bibliography.] 13 p. 33 cm. (Extr.: Deutsches meteorologisches Jahrbuch für Bayern. 1921.)

### RECENT PAPERS BEARING ON METEOROLOGY AND SEISMOLOGY.

C. F. TALMAN, Professor in Charge of Library.

The following titles have been selected from the contents of the periodicals and serials recently received in the library of the Weather Bureau. The titles selected are of papers and other communications bearing on meteorology and cognate branches of science. This is not a complete index of all the journals from which it has been compiled. It shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau.

*American journal of science.* New Haven. (5) v. 3. May. 1922.

Winchell, Alexander, & Miller, Eric R. The great dustfall of March 19, 1920. p. 349-364.

*American meteorological society. Bulletin.* Worcester, Mass. v. 3. 1922.

Brooks, C. F., & Donnelly, E. C. A scale of weather values with graph showing daily sequence of the weather. p. 63. Abstract. [April.]

Crump, M. H. Cave air versus torrid temperature. (By title.) p. 63-65. (April.)

Hoffman, F. L. Climate and health in the South American tropics. p. 65-66. (April.)

Humphreys, W. J. How fast can a droplet grow by falling in a cloud? p. 59-60. [Abstract.] (April.)

McAdie, Alexander. Comment on review of Redway's Handbook of meteorology. (By title.) p. 60-63. [Discussion of meteorological units.] (April.)

Reed, William Gardner. Military meteorology. p. 57-59. [Abstract.] (April.)

Bowie, E. H. The formation and movement of West Indian hurricanes. p. 95-96. [Abstract.] (June.)